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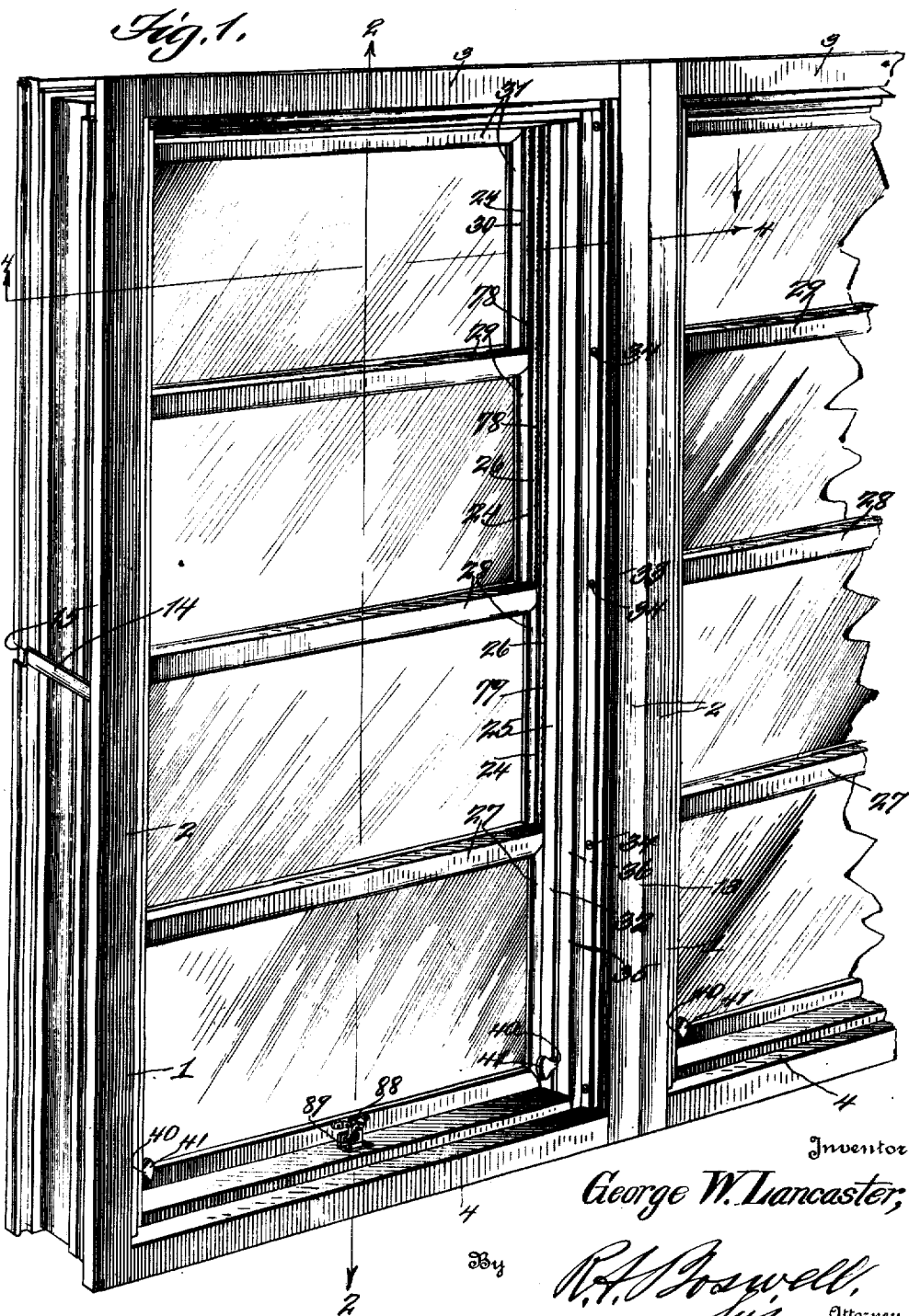
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G. W. LANCASTER

SHEET METAL WINDOW AND BALANCING SASHES

Filed April 11, 1923

4 Sheets-Sheet 1



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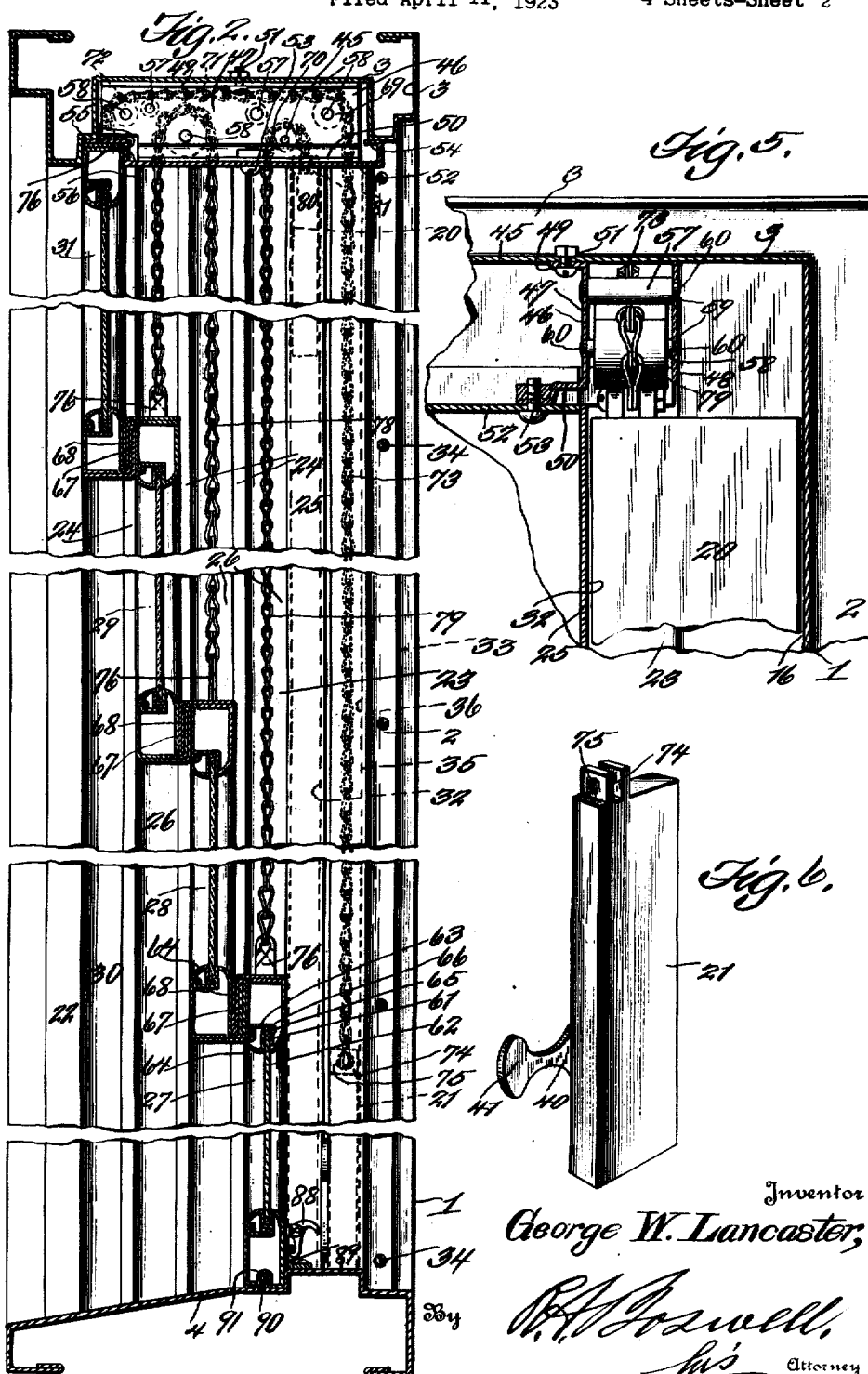
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4 Sheets-Sheet 2



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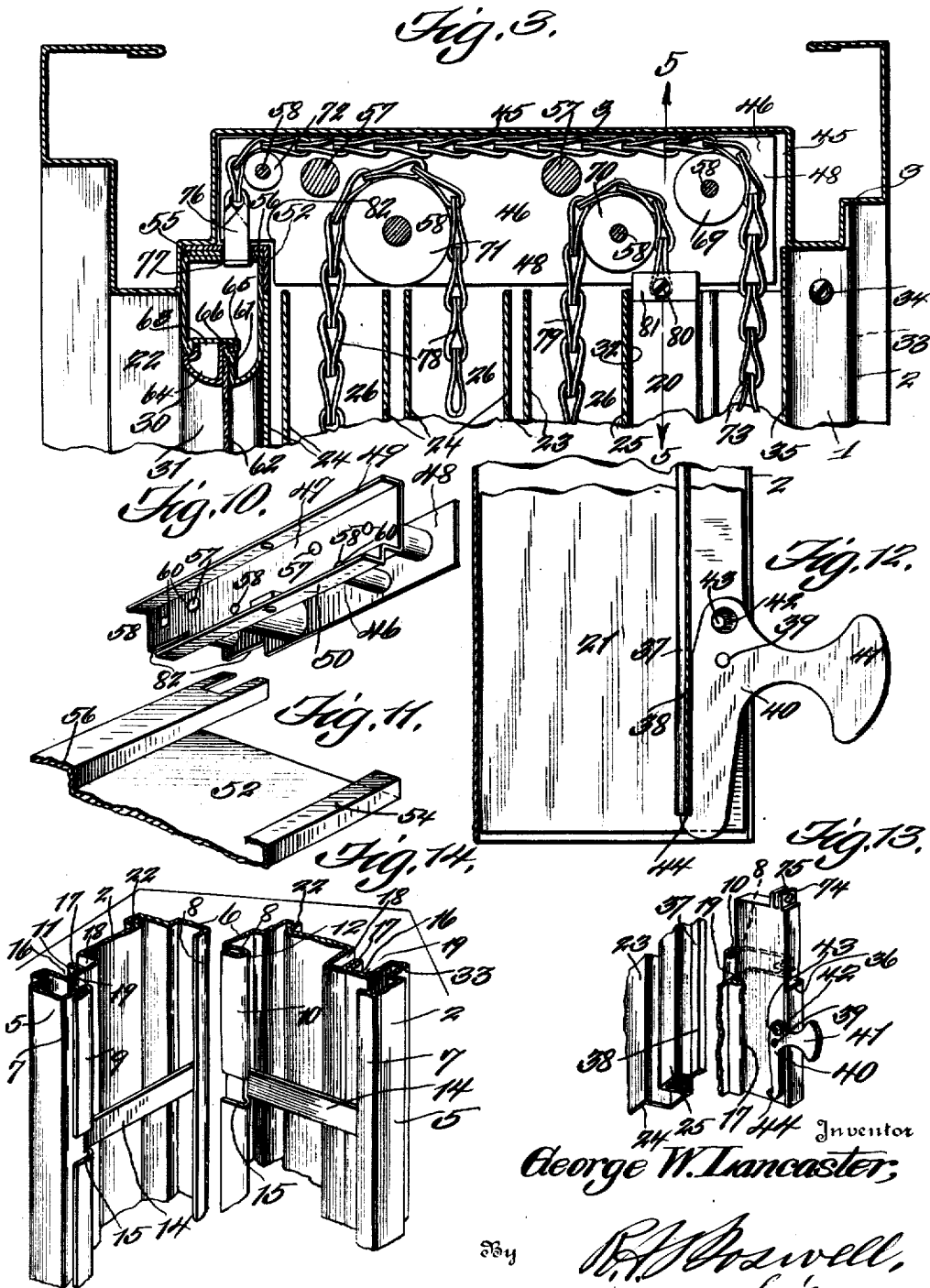
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SHEET METAL WINDOW AND BALANCING SASHES

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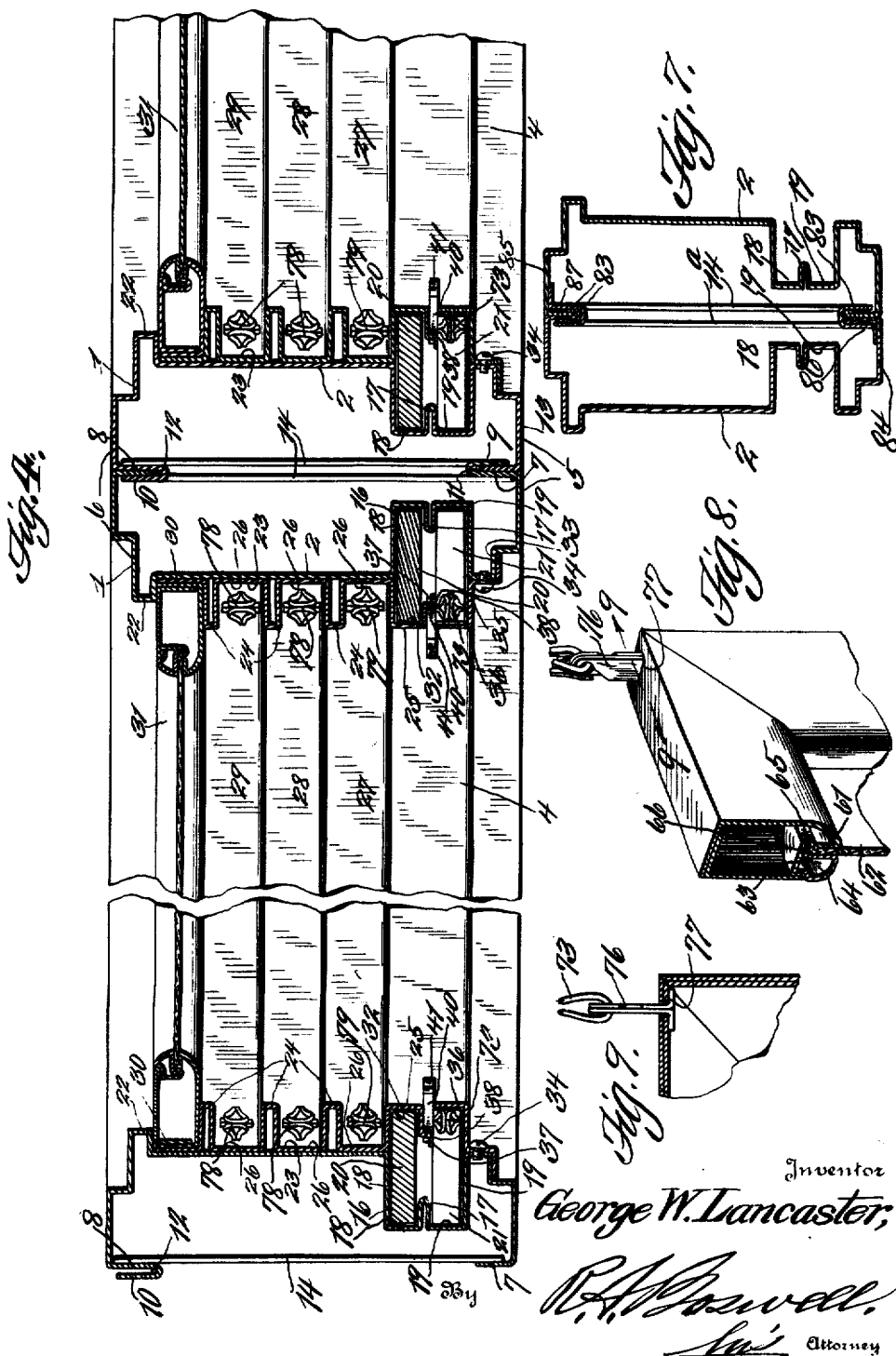
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SHEET METAL WINDOW AND BALANCING SASHES

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UNITED STATES PATENT OFFICE.

GEORGE W. LANCASTER, OF RICHMOND, VIRGINIA.

SHEET-METAL WINDOW AND BALANCING SASHES.

Application filed April 11, 1923. Serial No. 631,416.

To all whom it may concern:

Be it known that GEORGE W. LANCASTER, a citizen of the United States of America, residing at Richmond, in the county of Henrico and State of Virginia, has invented new and useful Sheet-Metal Windows and Balancing Sashes, of which the following is a specification.

The present invention has for its purpose the provision of a sheet metal window frame construction including sheet metal balancing sashes, wherein the main lintel of the frame has an upwardly formed depression, which, together with an auxiliary lintel, (which gives a finish to the window) constitutes a housing for the pulley boxings or mountings in the upper corners of the window frame. In this way the boxings or mountings are obscured, the boxings being fastened to the main lintel, while the auxiliary lintel is secured to the boxings, which is another essential purpose of the invention.

Still another purpose of the invention is to provide a window of such standard sheet metal construction that it may be installed in buildings of various designs, during the course of their construction or subsequently.

Although it is common to employ balancing sashes, as in the prior art well known to the present inventor, it is the aim to use upper, lower and intermediate sashes, the latter thereof being counter-balanced, while the upper and lower sashes are weight-balanced, and since the lower sash may be locked, the intermediate sashes are locked, due to their inter-connections.

In the installation of a sheet metal window of this character, it is the aim to provide separate guides for the weights, which are freely operable without interference with each other, and as the balancing weights for the upper sash may be locked or latched, the upper sash may be locked.

As a result of this arrangement and construction of sashes it will be noted that the intermediate sashes cannot be disposed in different adjusted positions, due to the upper outermost sash being locked by its weights.

A further purpose is the provision of

means for spacing parts of the pulley boxings or mountings from the upper edges of the guides, in which the sashes and weights are mounted, thereby preventing the upper ragged edges, if any, on the upper ends of the guides, from interfering with the boxings.

In order to provide a window of standard construction for installation in various designs of buildings during their construction or subsequently, the stiles of the window frame are in the form of sheet metal casings, which are provided with interlocking means, whereby when two or more frames are interlocked, a mullion is provided between the frames. The interlocking means is of such construction as to permit two or more frames to be slid into place in the window opening, and the wall filled out around the frames, thereby permitting old, as well as new buildings to be equipped with windows of this kind.

In window frames of this character, the stiles are hollow or in the form of casings to partly receive the brickwork of the building, and to reinforce the sides of the hollow stiles transverse bars connect the sides. To prevent the bars from interfering with the interconnecting of the frames, the interlocking means have cut-away portions to permit of the reception of the bars.

To insure a simple locking or latching for the weights, the lower extremities of certain of the guide walls of the guides for the weights are engaged by gravity latches or locks, which are carried by the weights, that is, when the weights are lowered and the upper outermost sash raised.

A still further purpose is to provide improved pulley boxings, which comprise opposed plates, the pulley pin mountings or journals of which are constructed so as to insure spacing means to hold the plates in spaced positions, and in such wise as to prevent binding of the pulleys, which are carried revolvably upon the pins and between the plates.

The invention also contemplates improved means for glazing or setting the glasses in the balancing sheet metal sashes, the rails of

which are hollow, and in such manner as to preclude the weather, as well as to prevent rattling.

It is to be understood that the particulars herein given are in no way limitative and that while still remaining within the scope of the invention, any desired modifications of detail and desired proportions may be made in the apparatus according to circumstances.

The invention comprises further features and combinations of parts, as will be hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a perspective view of two interlocked window frames, showing a mullion between them, and also disclosing the balancing sashes.

Figure 2 is a vertical sectional view on line 2—2 of Figure 1.

Figure 3 is an enlarged sectional view of the upper portion of the window frames shown in Figure 2.

Figure 4 is a transverse sectional view on line 4—4 of Figure 1.

Figure 5 is a sectional view on line 5—5 of Figure 3, showing the mounting of sash cord pulleys and their spacing pins, to hold the plates of the boxings in spaced positions.

Figure 6 is a detail view of one of the weights.

Figure 7 is a detail sectional view of the stiles of two frames, showing a modified construction of connection to provide a mullion.

Figure 8 is a detail perspective view of one corner of a balancing sash, showing the connection for the sash cord or chain.

Figure 9 is a sectional view on line 9—9 of Figure 8.

Figure 10 is a perspective view of one of the pulley boxings.

Figure 11 is a detail perspective of the auxiliary lintel.

Figure 12 is a sectional view of the lower portion of one of the guides for one of the weights, showing how the latch or lock engages the lower extremity of the wall of the guide.

Figure 13 discloses detail perspective views of portions of the walls of the weight guide, showing the latch or lock and the intumed flange with which the latch or lock engages.

Figure 14 discloses detail perspective views of the adjoining stile walls of the frames, showing their construction and how they may interlock, whereby the reinforcing bars will not act as a hindrance to the interconnection.

Referring to the drawings,

1 designates each window frame as a whole, which comprises the stiles 2, the main lintel 3 and the sill 4. The stiles, the lintel and the

sill are hollow, therefore, are constructed of any suitable sheet metal, preferably galvanized. Where two window frames are adjoined, as in the drawings, Figures 1 and 5, the inner and outer walls 5 and 6 of the stiles are provided with intumed flanges 7 and 8, which adjoin, as in Figures 1, 5 and 14. The intumed flange 7 of the stile 5 on the left in Figures 5 and 14 and diagonally opposite flange 8 of the stile wall on the right terminate in bent flanges 9 and 10 forming channels 11 and 12. The flange 7 of the stile wall on the right and the intumed flange 8 of the stile wall on the left engage said channels 11 and 12, as in Figures 1, 5 and 14, to interlock the frames. When the frames are connected, the adjacent stiles thereof constitute a mullion 13, Figures 1 and 5. By this construction of interlocking the stiles of the frames, it is possible to install the frames in buildings during their construction, or subsequently, particularly the latter by sliding the frames in place. The opposed walls of the stiles are braced by means of transverse reinforcing bars 14. In order to prevent the bars 14 hindering the connection of the stiles, the flanges 9 and 10 have cut-away portions 15, which permit of the reception of the bars, when the frames are connected to form the mullion. Due to the stiles, lintel and sill being hollow, the brick or other wall of the building may be extended into the hollows thereof, thereby insuring holding the frames in position securely, and in such a manner as to preclude the weather.

The adjacent walls of the stiles of each window frame, close to the inner portion of the frame, are longitudinally countersunk forming channels 16, the bottoms of which are formed with longitudinal tongues 17, thereby sub-dividing the channels into vertical guides 18 and 19, for the weights 20 and 21. Also the adjacent walls of the stiles, close to their outer portions, are formed with longitudinal ribs 22. Secured by any suitable means, preferably by spot welding to the adjacent walls of the stiles, are plates 23, which are formed with spaced ribs 24 and 25, there being intervening channels or guides 26. These channels or guides 26 receive the lower innermost and the upper and lower intermediate sashes 27, 28, and 29. The opposed ribs 24 adjacent the outer portion of the window frame are spaced from the ribs 22, thereby causing to be formed opposed channels or guides 30, for the reception of upper outermost sash 31. The ribs 25 are opposite the guides 18, whereby their hollows may constitute guides 32, to cooperate with the guides 18 for guiding the weights 20. Secured to the inner rabbeted edges 33 of the stiles, by any suitable means, preferably screws 34, although spot welding may be used, are stile trim

plates 35. These plates have portions conforming to the rabbeted edges 33 of the stiles, and are also provided with angle portions, the hollows of which act as guides 36 opposite the guides 19, to insure guiding the weights 21. It will be noted that certain walls of the guides 32 have extension flanges 37 extending inwardly. These extension flanges are opposite and cooperate with the longitudinal tongues 17, to retain the weights separated and guide them during their vertical reciprocating movements, when adjusting lower innermost and upper outermost sashes. The extension flanges 37 are angularly bent, as at 38, so as to retain the weights spaced equal to the thicknesses of the tongues 17 and so that the weights 21 may slide against certain of the faces of the extension flanges, instead of engaging their edges which would be the case, if such flanges were not so formed.

Pivoted upon headed pins 39 (which are carried by the weights 21) are latches 40, the handles 41 of which may be used to operate the latches to release the weights. Certain side walls of the ribs 25 are spaced from the edges of the guides 36 equal to the thicknesses of the latches, so that the latches may operate between the ribs and said edges, as the weights 21 operate vertically. The latches 40 have openings 42, through which pins 43 (which are carried by the weights) extend, thereby permitting the latches to have limited movements, sufficiently to enable the hooks or shoulders 44 of the latches to engage with the lower extremities of the extension flanges 37, when the weights are in their lowered positions and the upper outermost sash is raised.

The main lintel 3 is hollow and constructed of sheet metal and formed with a broad upwardly protruding depression 45 extending the length of the lintel. Mounted in the ends of the depression are pulley boxings 46, each of which comprises the opposed plates 47 and 48. The plates 47 have upper and lower longitudinal flanges 49 and 50. Suitable bolts or other fastening means 51 pass through the flanges 49 and the bottom of the depression to secure the boxings in position. In order to give the main lintel a finish, and to obscure the boxings, an auxiliary lintel plate 52 is secured by screw bolts 53 to the flanges 50 of the boxings, so as to cover the depression. The inner edge portion of the auxiliary lintel plate has an angular flange 54, which engages with the inner portion of the main lintel, as shown. The outer wall of the depression has a rabbet 55, while the outer edge portion of the auxiliary lintel plate is formed with an angular part or rabbet 56, the bottom wall of which engages the rabbet 55. Obviously, the opposed rabbets 55 and 56 constitute a channel for the reception of the upper rail of the upper out-

ermost sash 31, when in a raised position. Spacing and journal pins 57 and 58 connect the plates 47 and 48, by swaging the reduced ends 59 in the plates 47 and 48, as at 60, thereby holding the plates rigidly parallel. The journal pins 58 also act as spacing and holding means for the plates.

The side, top and bottom rails of each of the sashes are hollow and are constructed of sheet metal. The sheet metal of each rail is bent to form a rabbet 61 to receive the glass 62. Each rail is formed with a channel 63 for the reception of a hollow bead 64, which is provided with a flange 65 to enter a groove 66 formed in the bottom of the channel under the rabbet 61. Each retaining bead is sprung into position for glazing the glass in the sash. The sheet metal of the rails, after being bent to form the shaped in cross-section shown in Figure 2, is overlapped and spot welded or otherwise connected. Adjacent where the metal is overlapped, the lower rails of the sashes 28, 29 and 31 are formed with upwardly bent tongues 67, which are parallel with said lower rails. The upper rails (adjacent where the sheet metal thereof is overlapped) of the sashes 27, 28 and 29, are also formed with tongues 68, (which are parallel to the rails) to engage between the tongues 67 and the lower rails of the sashes 28, 29 and 31, thereby interlocking the sashes. The vertical and horizontal rails of each sash at the corners thereof are mitered and spot welded or otherwise connected, as shown in Figure 8.

Revolubly mounted on the journal pins 58 are pulleys 69, 70, 71 and 72, and passing over the pulleys 69, there being only one shown, is a sash cord or chain 73, one end of which is attached between the ears 74 of the weight 71, as at 75, and its other end connected to the reversely disposed hook ears 76, which are secured to the upper outermost sash 31, in any suitable manner, as at 77. However, in connecting the chain 73 or sash cord to the sash 31, it is first passed over the pulleys 69 and 72. Connected to the upper rails of the sashes 28 and 29 by reversely disposed hook ears 76 and passing over the pulley 71 is a sash cord or chain 78, for permitting the sashes 28 and 29 to counterbalance. Also connected by means of reversely disposed hook ears 76 to the sash 27 is a sash cord or chain 79, which passes over the pulley 70 and is in turn connected at 80 between the ears 81 of the weight 20, thereby counterbalancing the lower innermost sash 27 with the weight 20.

The opposed plates 47 and 48 of the pulley boxings have cut-away portions 82 to receive the angular or rabbeted part of the auxiliary lintel plate, when the same is arranged in place.

In Figure 7 of the drawings, the inner

and outer walls of the stiles have inturned flanges 83. In order to obtain the same fastening result of the stiles, as in Figure 5, the inner wall 84 of the stile on the left and the outer wall 85 of the stile on the right have secured to their inner faces by spot welding or the like, plates 86 and 87, which are bent over and engaged with the flanges 83. The bent over parts of said plates 86 and 87 are to be provided with cut-away portions (not shown) similar to the cut-away portions 15, to receive the bars 14^a, so that the bars will not interfere with uniting the stiles.

When the sashes and the weights are disposed, as in Figure 2, the lower innermost sash and the weight 21 latched or locked, the other sashes are correspondingly locked. Obviously, the lower innermost sash may be locked by a latch 88 which engages a keeper 89, which is fastened in any suitable manner on the sill of the window frame, as in Figures 1 and 2.

By grasping the handles 41 of the latches 40 simultaneously and pulling upwardly thereon, their hooks or shoulders are disengaged from the lower extremities of the extension flanges 37, which will permit the weights to be raised and the upper outermost sash lowered. The other sashes will remain locked, as long as the lower innermost sash remains latched. However, as soon as the latch 88 is released, the lower innermost sash may raise, in which case all of the sashes are free to be adjusted as may be desired. The lower innermost sash may be released and raised, without releasing and raising the weights 21, and as a result of this it is obvious as to how the other sashes may be manipulated, for instance, in a manner previously set forth.

Having set forth the invention, what is claimed is:—

1. In a window structure, a pair of adjacent window frames having sheet metal hollow stiles, the walls of the adjacent stiles having inter-slidably united flanges for adjoining the stiles, whereby said adjacent stiles may constitute a mullion, and bracing means for reinforcing the walls of the adjoining stiles, said inter-slidably united flanges having cut-away portions to receive said bracing means to prevent the bracing means from interfering with slidably adjoining the stiles.

2. A window mullion, comprising a pair of hollow sheet metal stiles, means for connecting said stiles, the wall of each stile adjacent the inner portion of the window being formed with a vertical channel, a sheet metal plate formed with a plurality of alternate sash guide ways and parting tongues and secured to each stile, the inner portion of said plate overlying part of said

channel, and a stile trim plate secured to the inner portion of each stile and overlying an opposite part of the channel.

3. A window mullion, comprising a pair of hollow sheet metal stiles, means for connecting said stiles, the wall of each stile adjacent the inner portion of the window being formed with a vertical channel, a sheet metal plate formed with a plurality of alternate sash guide ways and parting tongues and secured to each stile, the inner portion of said plate overlying part of said channel, and a stile trim plate secured to the inner portion of each stile and overlying an opposite part of the channel, the overlying part of said sash plate and the bottom of said channel having opposed tongues to separately space and guide balancing weights.

4. A window mullion, comprising a pair of hollow sheet metal stiles, opposite walls of said stiles having inter-slidably united flanges for adjoining said stiles, bars reinforcing said flanged walls, certain of said flanges having cut-away portions to receive said bars, thereby preventing the bars interfering with uniting said stiles.

5. In a sheet metal window structure, a pair of adjoining window frames including hollow stiles and provided with sash guides, with counterbalancing sashes mounted in certain of the guides and weight-balanced sashes in certain other of said guides, balancing weights for the latter sashes, said stiles having guides for the weights, and inter-slidably united means for connecting the adjacent stiles of the frames, whereby said stiles may constitute a mullion between the frames.

6. The combination with a pair of adjoining sheet metal window frames, each comprising hollow stiles with guides, with sashes in certain of the guides, said stiles including guides for sash weights, the walls of the adjacent stiles having inter-slidably united flanges for adjoining the stiles, whereby said adjoining stiles may constitute a mullion, and bracing means for reinforcing the adjoining stiles.

7. Window structure including a window frame having hollow stiles, the remote vertical marginal portions of the opposed walls of the stiles being spaced so as to provide the stiles with substantially unobstructed interiors, said vertical marginal portions having means to effect an inter-slidable union between said frame and other similar frames, the adjacent stiles of said other similar frames being so formed as to effect such unions, the united stiles constituting mullions between the several frames.

8. Window structure including a window frame having hollow stiles, the remote vertical marginal portions of the opposed walls

of the stiles being spaced so as to provide the stiles with substantially unobstructed interiors, said vertical marginal portions having means to effect an interslidable union 5 between said frame and other similar frames, the adjacent stiles of said other similar frames being so formed as to effect such unions, the united stiles constituting mullions between the several frames, and bracing means for reinforcing the marginal 10 portions of the opposed walls of the stiles.

In witness whereof the inventor's signature is hereunto affixed.

GEORGE W. LANCASTER.

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In witness whereof the inventor's signature is hereunto affixed.

GEORGE W. LANCASTER.

Certificate of Correction.

It is hereby certified that Letters Patent No. 1,552,436, granted September 8, 1925, upon the application of George W. Lancaster, of Richmond, Virginia, for an improvement in "Sheet-Metal Windows and Balancing Sashes," were erroneously issued to the inventor, said "Lancaster," whereas said Letters Patent should have been issued to *Perfected Window Company, of Richmond, Virginia, a Corporation of Virginia*, said corporation being assignee of the entire interest in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22d day of September, A. D. 1925.

[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.

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[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.